

## CLAIMS

What is claimed is:

1. A method for providing network states for a home phone line network, comprising the steps of:
  - (a) determining if a receive-detect-with-PCOM=0 signal is asserted;
  - (b) asserting a set-detected-private communication field (PCOM)=0 signal if the receive-detect-with-PCOM=0 signal is asserted, wherein assertion of the set-detected-PCOM=0 signal asserts a detected signal with a PCOM field set to "0";
  - (c) determining if a receive-detect-with-PCOM=2 signal or a transmit-detect-with-PCOM=2 signal is asserted;
  - (d) asserting a set-signaled signal if either the receive-detect-with-PCOM=2 signal or the transmit-detect-with-PCOM=2 signal is asserted, wherein assertion of the set-signaled signal asserts a signaled signal;
  - (e) determining if a force-first-mode signal is asserted, or a combination of a force-second-mode signal not being asserted and either the detected signal or the signaled signal being asserted;
  - (f) setting a network state to a first mode if the force-first-mode signal is asserted, or the combination of the force-second-mode signal not being asserted and either the detected signal or the signaled signal being asserted; and
  - (g) setting a network state to a second mode if the network state is not the first mode.

2. The method of claim 1, wherein the determining step (a) further comprises:

(a1) determining if a current-first-mode signal is asserted and if a current-second-mode signal is asserted;

(a2) enabling a plurality of counters for a rate request control frame (RRCF), if the current-first-mode signal is asserted;

(a3) determining if a link-integrity-status signal is asserted and if a receive-detect-with-PCOM=1 signal is asserted, if the current-second-mode signal is asserted; and

(a4) asserted a set-detected-PCOM=1 signal, if the link-integrity-status signal and the receive-detect-with-PCOM=1 signal is asserted, wherein assertion of the set-detected-PCOM=1 signal asserts the detected signal with a PCOM set to "1".

3. The method of claim 2, wherein the current-first-mode signal is asserted when a station is in a 1M8 mode under a Home Phone Line Networking Alliance specification version 2.0 ("HPNA 2.0").

4. The method of claim 2, wherein the current-second-mode signal is asserted when a station is in a 10M8 mode under a HPNA 2.0.

5. The method of claim 2, wherein the link-integrity-status signal is asserted when a station is connected to another station in the network.

6. The method of claim 2, wherein the receive-detect-with-PCOM=1 signal is

asserted when a station detects receiving a 1M8 format frame with a PCOM field set to "1".

7. The method of claim 6, wherein the PCOM field set to "1" refers to a station in a V1M2 mode or a station in a 1M8 mode if the detected signal is not asserted.

8. The method of claim 2, wherein assertion of the set-detected-PCOM=1 signal asserts the detected signal with a PCOM field set to "1".

9. The method of claim 1, wherein the receive-detect-with-PCOM=0 signal is asserted when a station detects receiving a 1M8 format frame with a PCOM field set to "0".

10. The method of claim 9, wherein the PCOM field set to "0" refers to a station which supports a 1 megabit-per-second (mpbs) data rate but not a 10 mpbs data rate.

11. The method of claim 1, wherein assertion of the set-detected-PCOM=0 signal asserts the detected signal.

12. The method of claim 1, wherein the receive-detect-with PCOM=2 signal is asserted when a station detects receiving a 1M8 frame with a PCOM field set to "2".

13. The method of claim 11, wherein the PCOM field set to "2" refers to a station in a V1M2 mode or a station in a 1M8 mode if the signaled signal is asserted.

14. The method of claim 1, wherein the transmit-detect-with-PCOM=2 signal is asserted when a station detects transmission of a 1M8 format frame with a PCOM field set to "2".

5 15. The method of claim 1, wherein assertion of the set-signaled signal asserts the signaled signal.

16. The method of claim 1, wherein the setting step (f) further comprises:  
(f1) setting the network state to the first mode if a force-third-mode signal is asserted.

17. The method of claim 16, wherein the force-third-mode signal is a ConfigV1M2 signal under HPNA 1.0, wherein asserting the ConfigV1M2 signal forces a station into a V1M2 mode.

18. The method of claim 1, wherein the force-first-mode signal is a ConfigV1 signal under HPNA 2.0, wherein asserting the ConfigV1 signal forces a station into a 1M8 mode.

20 19. The method of claim 1, wherein the force-second-mode signal is a ConfigV2 signal under HPNA 2.0, wherein asserting the ConfigV2 signal forces a station into a 10M8 mode.

20. The method of claim 1, wherein the first mode is a 1M8 mode under HPNA

2.0.

21. The method of claim 1, wherein the second mode is a 10M8 mode under  
5 HPNA 2.0.

22. The method of claim 1, wherein the setting step (f) comprises:

(f1) determining if a RRCF-timer-out signal is asserted, if the force-mode signal  
is asserted or the combination of the force-second-mode signal not being asserted and either  
the detected signal or the signaled signal being asserted;

(f2) asserting a send-RRCF signal and a reset-RRCF signal, if the RRCF-timer-  
out signal is asserted; and

(f3) setting the network state to the first mode.

23. The method of claim 22, wherein the RRCF-timer-out signal is asserted when  
a life span of a last RRCF has expired.

24. The method of claim 22, wherein assertion of the send-RRCF signal sends a  
RRCF.

25. The method of claim 22, wherein assertion of the reset-RRCF signal resets  
the plurality of counters for the RRCF.

26. The method of claim 1, wherein the setting step (f) comprises:

- (f1) asserting a send-RRCF signal and a reset-RRCF signal; and
- (f2) setting the network state to the second mode.

5 27. The method of claim 1, wherein the setting step (k) comprises:

- (k1) asserting a reset-RRCF signal; and
- (k2) setting the network state to the second mode.

28. A network state machine, comprising:

10 a receive-detect-with-PCOM=0, wherein the receive-detect-with-PCOM=0 signal is asserted when the station detects receiving a 1M8 format frame with a PCOM field set to "0";

15 a set-detected-PCOM=0 signal, wherein the set-detected-PCOM=0 signal is asserted when the receive-detect-with-PCOM=0 signal is asserted, wherein assertion of the set-detected-PCOM=0 signal asserts a detected signal;

a receive-detect-with-PCOM=2 signal, wherein the receive-detect-with-PCOM=2 signal is asserted when the station detects receiving a 1M8 format frame with a PCOM field set to "2";

20 a transmit-detect-with-PCOM=2 signal, wherein the transmit-detect-with-PCOM=2 signal is asserted when the station detects transmission of a 1M8 format frame with a PCOM field set to "2";

a set-signaled signal, wherein the set-signaled signal is asserted when the receive-

detect-with-PCOM=2 signal or the transmit-detect-with-PCOM=2 signal is asserted, wherein  
assertion of the set-signaled signal asserts a signaled signal;

a force-first-mode signal, wherein the force-first-mode signal is asserted when the  
station is to be forced into the 1M8 mode;

5 a force-second-mode signal, wherein the force-second-mode signal is asserted when  
the station is to be forced into the 10M8 mode;

wherein a network state of the station is set to the 1M8 mode if the force-first-mode  
signal is asserted, or a combination of the force-second-mode signal not being asserted and  
either the detected signal or the signaled signal being asserted,

wherein the network state is set to the 10M8 mode if the network state is not the 1M8  
mode.

29. The machine of claim 28, further comprising:

a current-first-mode signal, wherein the current-first-mode signal is asserted when a  
station is in a 1M8 mode;

a current-second-mode signal, wherein the current-second-mode signal is asserted  
when the station is in a 10M8 mode;

a link-integrity-status signal, wherein the link-integrity-status signal is asserted when  
the station is connected to another station in a network;

20 a receive-detect-with-PCOM=1 signal, wherein the receive-detect-with-PCOM=1  
signal is asserted when the station detects receiving a 1M8 format frame with a PCOM field  
set to "1";

a set-detected-PCOM=1 signal, wherein the set-detected-PCOM=1 signal is asserted when the link-integrity-status signal and the receive-detect-with-PCOM=1 signal is asserted and if the current-second-mode signal is asserted, wherein assertion of the set-detected-PCOM=1 signal asserts the detected signal with a PCOM set to "1";

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30. The machine of claim 29, wherein the PCOM field set to "1" refers to a station in the V1M2 mode or a station in the 1M8 mode if the detected signal is not asserted.

31. The machine of claim 28, wherein the PCOM field set to "0" refers to the a station which supports a 1 mpbs data rate but not a 10mpbs data rate.

32. The machine of claim 28, wherein the PCOM field set to "2" refers to a station in a V1M2 mode or a station in the 1M8 mode if the signaled signal is asserted.

33. The machine of claim 28, further comprising a force-third-mode signal, wherein the force-third-mode signal is a ConfigV1M2 signal under HPNA 2.0, wherein the network state is set to the 1M8 mode if the force-third-mode signal is asserted.

34. The machine of claim 28, wherein the force-first-mode signal is a ConfigV1 signal under HPNA 2.0.

35. The machine of claim 28, wherein the force-second-mode signal is a



ConfigV2 signal under HPNA 2.0.

36. The machine of claim 28, further comprising:

5 a RRCF-timer-out signal, wherein the RRCF-timer-out signal is asserted when a life span of a last RRCF has expired;

a send-RRCF signal, wherein the send-RRCF signal is asserted when the network state is to be set to the 1M8 mode, or the RRCF-timer-out signal is asserted and the network state is to be set to the 1M8 mode, wherein assertion of the send-RRCF signal sends a RRCF;

10 a reset-RRCF signal, wherein the reset-RRCF signal is asserted after the send-RRCF signal is asserted, wherein assertion of the reset-RRCF signal resets a plurality of counters for a RRCF.